Process improvement with measurable data in higher education institution

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These days, the challenges in the public sector press the higher education institutions to change their attitude in Hungary. Like in other European countries education has become a mass-market service, which can be described by increasing number of students and by a more complicated function of institutions. But the role of customers and the subject of quality are gaining more attention in their operations. The adaptation of process-oriented quality management systems which can ensure these outcomes has just started. The identification, measurement and management of the organizational processes is crucial for their effective functioning. The key of organisational success is consistent application of quality improvement process.
We prove the applicability of process-oriented approach at different levels of higher education organisation and demonstrate some utilization of quality management tools. Though the continuous improvement of processes is still new to higher education, the necessary measurements of the whole processes or parts of them already exist. We highlight the role of application of these data in quality improvement. The practical examples are prepared in the Department of Management and Corporate Economics of Budapest University of Technology and Economics (BUTE), which is knowns the flagship of teaching and researching quality management at the University.

higher education, quality measurement and evaluation, student satisfaction, improving actions

Quality management aspects in higher education

In the recent decades, the increase of the number of higher education institutions, the demographical data, the introduction of credit system, the Bologna process and the changes in the demands of labour market have led to the appearance and strengthening of competition for the institutions in higher education. In this process, offering quality education and service is becoming a crucial element of the competition. Within the operation of the institutions, this is provided by quality management systems. Strategic approach is slowly getting into the focus of the institutions' management, and reviewing managerial roles including the introduction of modern elements of quality management in the management on the level of institutions, faculties and organizational units has become essential.
Higher education institutions have been applying quality management system elements systematically in their operations for 10 to 15 years. Regrettably, and similarly to other production and service sectors, there are many meaningless and formal solutions in this sector, too. (Topár, 2015)
On the longer term, the bases of quality management systems can be provided by establishing the TQM management philosophy in our higher education institutions. This quality management approach is the closest to the organizational culture of knowledge-based organizations. At the same time, it requires breaking up with the authoritarian leadership system sometimes also including feudal elements. In the field of services including higher education, a change of approach slowly perceptible in some domains of the economy is followed: the boundaries of quality management system as a

corporate subsystem are fading away, and the strengthening of the TQM approach makes the elements related to the quality management system integral parts of the management system. This sector also needs to change the overall approach from "managing the quality" to "the quality of the management", which means a fundamental change in all levels of the management. (Kano, 2007)

We have to be aware of the fact that quality management is primarily based on the beneficial use of business data, information and knowledge. In the context of professional quality applications, a number of methods, tools and practices from other managerial fields can be applied. In consistent management systems, tools are properly developed and maintained. In the recent years, the role of process management in the improvement of operational efficiency has been increasing substantially. (Antilla, 2008)

In the sense of the principle "If you can't measure it, you can't manage it; you can only let it grow by itself", a rather sophisticated measurement culture shall be associated with social services such as higher education systems. The usual response to this is that many administrative processes and the operational attributes of the related resources (so called soft factors such as leadership) can't be measured. However, this is not true because organizational factors can be measured: a team including professionals with decent experience and qualification is able to accomplish it. Obviously, the concept of measuring needs to be extended. (Conti, 2011)

The quality efforts of higher education in Hungary cannot be separated from the ideas spreading in the European Union. To establish the European Higher Education Area, the European University Association (EUA) has specified the quality criteria focusing on scientific autonomy, the strengthening of strategic thinking mode in leadership, the quality of the stakeholders of institutions (students and lecturers) and, last but not least, continuous feedback and continuous process improvement.

The European Association for Quality Assurance in Higher Education (ENQA) represents the values considered important for the quality operation of the institutions of the European higher education area. The European Commission has supported the operation of the organization from the very beginning.

In the understanding of ENQA, a quality assurance system consists of three elements:

- transforming the accreditation policy to quality policy, i.e. the establishment of state/government quality assurance policy and organization,
- under this effort, implementing of a strong quality orientation (partly by motivation: quality award, award of excellence, and partly by consultation and developing standards and recommendations),
- establishing the institutional quality assurance procedures and organizational conditions the higher education system has been lacking so far.

At the Bergen Meeting in May 2005, the European higher education ministers have passed the "Standards and Guidelines for Quality Assurance in the European Higher Education Area", the draft of which had been worked out by ENQA. These standards have been recently reviewed in Yerevan during the spring of 2015, followed by a specification of new standards and guidelines.

Also the market circumstances make it necessary to develop the quality management approach and systems of institutions (unless they are significantly limited). This work is recommended to be based on TQM leadership philosophy and ENQA principles and standards.

Establishing and developing an institutional quality management system certainly cannot be handled separately from the issue of quality culture. The leaders of institutions and the employees influencing the elements of the quality management system shall consider the followings in their activity:

"The quality culture means a chosen value, shared responsibility and an appropriate behaviour and attitude that applies to every citizen of the institution."

"…institutions have to play and active role in ensuring that academic values and principles prevail over bureaucratic elements."

"The primary task of an institution is to work out their own long-term strategy including a quality management system"

"....we can talk about the presence of quality culture in a higher education institution if both the academic and the administrative staff accept the fact that regular monitoring is required to make operations transparent, but avoiding its manifestation in the bureaucratic system." (Hrubos, 2009)

Strategic elements have a growing part in the management of institutions. The appearance of institutional development plans is a visible element of this (actual plans instead of formal plans!). One of the consequences of the strengthening of strategic thinking is that various management levels require the application of indicators assessing the level of operation of processes that serve as a base for making their decisions.

Establishing the possibility of making decisions based on data and facts at every level of a higher education institution is a crucial for the operation of any quality management system or any other system established based on TQM leadership philosophy as well as the application of ENQA standards and principles.

To develop a quality management system, it is expedient to use the data stored in the IT systems of the institution as a start. There is a rich database available that is usually not utilized properly to serve as a base to improve our processes and operation.

By evaluating and organizing the collected data appropriately, quality indicators can be created that meet the requirements of the applied quality management system and the goals set to improve the system (quality policy, quality targets). To utilize the quality indicators, we have to use data that are available regularly and simply, provided by the applied IT system. Indicators shall support operational activities and be suitable for establishing the controllability as well as ensuring the continuous development of the institution. Furthermore, indicators reflect the achievement of quality targets set, thereby enabling the collaboration of quality, IT and institutional controlling systems. The proper assessment of quality indicators enables specifying trends and working out development proposals by senior and mid-level management. (Topár - Bedzsula - Kövesi, 2011)

Basically, there are two levels of quality indicators: institutional/faculty (key) indicators promoting the work of senior management, and quality indicators supporting operational decisions that ensure the measurement of the institution's internal operations directly and serve as a base for key indicators. Of course, there are indicators providing information for analysing the entire sector or comparing its institutions. These indicators serve as a base for government and industry decision making. In this article, this area is not covered.

Article 1.7 of the ENQA standards and principles covers the creation and use of internal information and data as well as the application of the information management elements in the operation of institutions. As a standard, it is specified that institutions shall ensure the systematic collection, analysis and use of the information regarding their operations in various decisions. In the related principle, it is emphasized that it is essential for the institutions to have tools in place for collecting and analysing the data associated with their own processes. The results of the analyses serve as a base for the continuous improvement. The knowledge of these data and facts enables the comparison to other institutions and similar organizations, too. The implementation of these requirements provides a base for meeting the standard No. 1.8 on public information: "Institutions shall continuously provide information about their activities including quantity and quality data and information about their education programmes". (ENQA, 2015)

The management, measurement and assessment of the processes shall be key elements during the definition of quality procedures and quality policy of higher education. The narrow-minded application of the process approach offered by general quality management models, neglecting the characteristics of higher education will not lead to any result. The principle of thinking in processes shall be interpreted in a different way in case of educational processes than for the typically administrative processes supporting education. The key of competent application lies in defining activities to the appropriate extent: in case of very simple, often repeated activities that can be described easily, detailed definition can be helpful; however for complex and creative activities (such as education) it is recommended to avoid detailed definitions. At the same time, the clarification of the logical and chronological sequence of the activities in the organization as well as identifying the goals they serve and conscious management of the resources used is an absolutely positive aftermath of the application of this principle.

The organizational distinction used to be functional (in Hungary, this is still the prevailing approach), i.e. the leaders of the organizations used to think in organizational units, tasks and responsibilities upon dividing the organizational tasks. Nevertheless, the process approach as a state-of-the art solution has become dominant recently, for value creating processes do not keep organizational boundaries and they cross the frameworks of organizational units and functions. (Tóth - Jónás, 2014)

It is important to understand that there are two dominant influences at the same time prevailing in higher education basically worldwide. The first one is trying to apply strong quality expectations whereas there is another trend, conflicting the first one to a certain extent, focusing on economic conditions. This approach raises a difficult situation for the professionals forming the educational policy and organizing education of the modern age. It has to be admitted that the efficiency of the elements of a system can be enhanced only if its outputs and processes can be compared properly through objective assessments.

The continuous improvement of processes and the establishment of the elements of the underlying process management system are key elements of the TQM oriented quality management systems of universities. For this, it is essential to have the appropriate facts and data continuously at hand and to constantly improve the informational and database required for the assessments and analyses, too. Reliable data are essential to informed decision making and to find out what works well and what needs more attention. This is true at every level of management and process operation. Efficient information collection and analysis processes cover education programmes and other elements of the university's operations.

The quality management system of the university focuses on every field separately in this aspect; as a result of the logic of system operation it is the responsibility and task of every process owner to find and continuously improve the control and assessment possibilities associated with their processes.

The most important operational data and information are contained in the institution's databases. The service-like query, analysis and ad-hoc assessment of the data serve as a significant base for the improvement of the affected processes as well as the support and evaluation of the improvement by the managers. The establishment of regulations regarding this area for a faculty, department and programme is the responsibility of every manager involved.

Considering the challenges and interpretations of quality of higher education, in our opinion, the development of Hungarian institution susceptible to quality should be based on the following self-evident approaches:

- the philosophy of thinking in processes and introducing the related methods; the assessment of processes from the partners' point of view;
- making the practice of performance assessment and continuous improvement general.

Transforming the partners' feedback into a clear indicator is crucial in the field of higher education. In this study, we are focusing on this single choice of assessment out of the many available: we are examining the possibilities of utilizing the feedback received from students who are considered the most important partners as well as their level of satisfaction related to education.

Practical examples

In the quality management system of the Budapest University of Technology and Economics (BUTE), the student satisfaction measurement of courses (SSM) is a key element. In this procedure, the education programme is assessed internally by the customers, i.e. students. Related to the education of each subject, the satisfaction of students has been measured and their feedback has been collected since the '70s. Of course, this system has been modified and developed for several times. The latest version has been in place since autumn 2013 and was created in accordance with the regulations of the National Higher Education Act.

The questionnaire structure of SSM has been somewhat changed; however, the focus of the questions is the same as it used to be. The structure and operation of the current system is described in the policy of student satisfaction measurement of the University. Depending on the type of the specific subject (lecture, practical course or lab) there are different questions displayed to the students. The questionnaire may consist of three types of questions:

- obligatory questions
- recommended questions: recommendations defined at university level, but they can be omitted or replaced;
- lecturer's question: the lecturer and the person responsible for the subject can extend the list by one extra question each.

In case of subjects excluded from the traditional form of education, an entirely unique questionnaire can be compiled. (e.g. language and physical education subjects)

In case of lectures, the following obligatory questions shall be asked:

1. Please rate the quality of the lessons held by the lecturer below (please consider the following aspects: logical structure, captivating, easy to follow)
2. How suitable do you think the tests were for realistically assessing the knowledge learnt under this subject (please consider the following aspects: topics, questions, chosen method of examining)?
3. Please share your further comments regarding the lecturer.
4. Please assess to what extent the available resources and textbooks cover the topic of the subject and can be used to prepare for the exams.
5. Do you have any further comments regarding the subject, the exams or the faculty administration?
6. Please rate the subject with an overall mark.

Questions No. 3 and 5 can be answered by entering free text whereas in case of all other questions, students shall give a mark on a scale from 1 to 5 as usual in the Hungarian education system, (1 – fail, 5 – excellent). Neither is the completion of the questionnaire nor answering the questions obligatory; it is allowed to omit any question or even the entire questionnaire.

It is critical at the university to ensure the interest of the students involved in the assessment system as well as to achieve and ensure the highest completion rate possible. The higher the completion rate of the survey, the deeper the trust of the lecturers in the operation of the system and the results. The completion rate of the questionnaires for each subject within the new system is shown in figure 1 for the Faculty of Economic and Social Sciences (FESS).

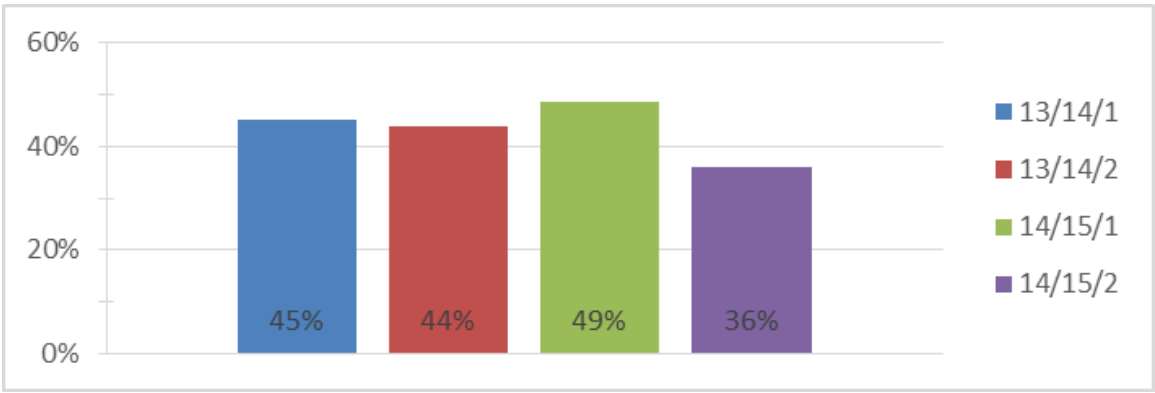

Figure 1: Completion rate of questionnaires for each subject (FESS)

The ratings of subjects and lecturers by students are considered representative if the questionnaire was completed by more than 5 people or 30% of the students taking the specific. In addition, results for questionnaires completed by up to 30 respondents are traditionally handled separately in cumulative results.

In the new system, in addition to the average values of each question related to lecturers or subjects, new indicators were defined through the combined examination of the former values. One of these new indicators is the Subject Quality Index (SQI), consisting of the ratings of the quality level of the lecture held by the lecturer (Question 1 – Q1) and the summary regarding the subject (Question 6 – Q6) according to the following formula (only for lectures and one lecturer):

$$SQI = \frac{Q1 * n_1 + Q6 * n_6}{N} \quad (1)$$

where

Q1 and Q6 are the average values of questions 1 and 6 of the questionnaire

n_1 and n_6 are the numbers of actual and valid respondents to questions 1 and 6 of the questionnaire ($N = n_1 + n_6$)

The subject average results at FESS (Question 6 – Q6) are shown in Figure 2.

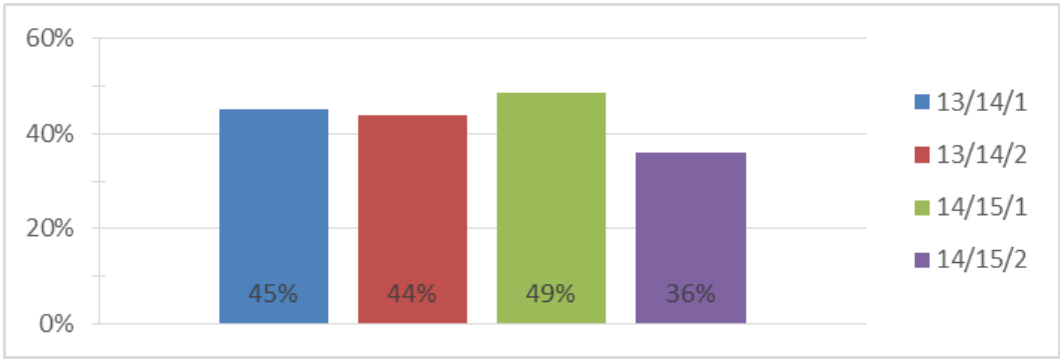

Figure 2: Subject average results at FESS

The system has been criticized many times because the SSM survey completion habits and reasons of the students are not known and can be different. There is a practical proposal that has been raised stating that it would be expedient to examine the relationship between each student's mark received for the subject and the rating they've given, or collect the ratings of lectures by students in person on paper and compare these results with the online ratings. However, based on the completion rates of the new and the former systems as well as the ratings given by students, we can state that students usually give consistent ratings from semester to semester. The SSM survey is basically stable and reliable therefore it is worth to build on its results.

The feedbacks received, though they undoubtedly include subjective elements, can be used by the lecturer and the managers of the organizational unit affected. In addition, it is expedient to utilize the assessment results at a faculty level, too.

The data stemming from the SSM system allow the professionals to carry out faculty or institution examinations or comparisons. The multiple disciplines covered by the operation of the University is a good example for the statement that, the data can only be used with proper consideration. Comparing the data of each faculty would not be expedient by itself, however, a study examining the rate of lecturers whose ratings have improved for each faculty can be reasonable. Figure 3 shows the rate of lecturers with an improving tendency in SSM survey results for the recent 6 semesters at 8 faculties of BUTE.

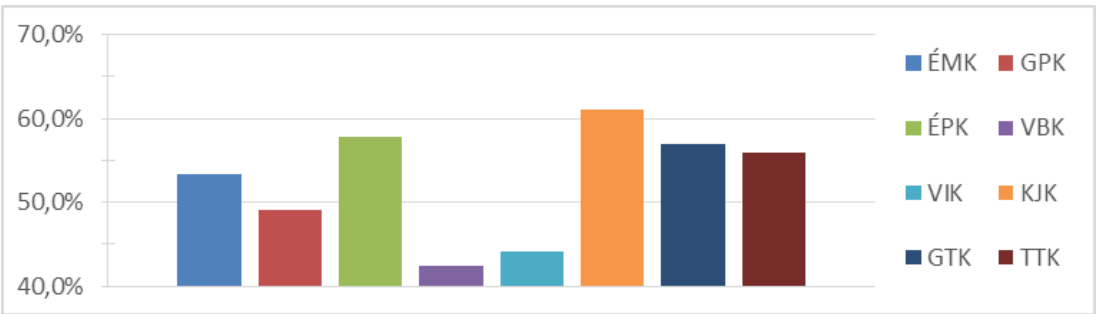

Figure 3: The rate of lecturers showing an improving tendency in SSM survey results for the recent 6 semesters (BUTE Controlling Report)

The FESS Faculty Committee has decided to apply the results of the SSM survey in dividing the faculty budget among departments. The resources coming from education are divided based on the x credit value of students that is multiplied by the department/faculty SSM average value for the recent two semesters to determine the education performance value of each department. The result of SSM survey could amend this value by a% at most in 2010 and 8% in 2011. However, when planning the 2012 annual budget, the result of the survey could entirely affect the departments' budget in the positive or negative direction.

The students' assessments about the master's programmes offered by the Institute of Business Studies of FESS represent not only a formal way of feedback given by students but it is also a factor affecting the lecturers' bonuses. According to the algorhythm determined by the faculty management, a rating is calculated using the SSM marks on the education, resources and examinations provided by each lecturer:

$$\text{Rating} = 0{,}5 * Q1 + 0{,}25 * Q2 + 0{,}25 * Q4 \qquad (2)$$

Upon calculating bonuses, the rating value determined by the faculty management is considered, currently equal to 3.5. The amount is proportional to the deviation from the target value.

$$\text{Amount} = (\text{Rating} - \text{Target value}) * \text{Numberof students} * \text{Credit} * \text{Norm} \quad (3)$$

If the rating of a lecturer is above the threshold value then they are granted bonus; if the rating is below the threshold value then the lecturer in question shall not be granted any bonus. If the values are repeatedly below 3.5 or 3.0 then it may be reasonable to appoint a new lecturer or even eliminate the subject in question. (Bedzsula, 2015)

So the study of the results achieved for several semesters supports the operational decisions at the management level and may justify the personal efforts made by each lecturer as shown in Figure 4.

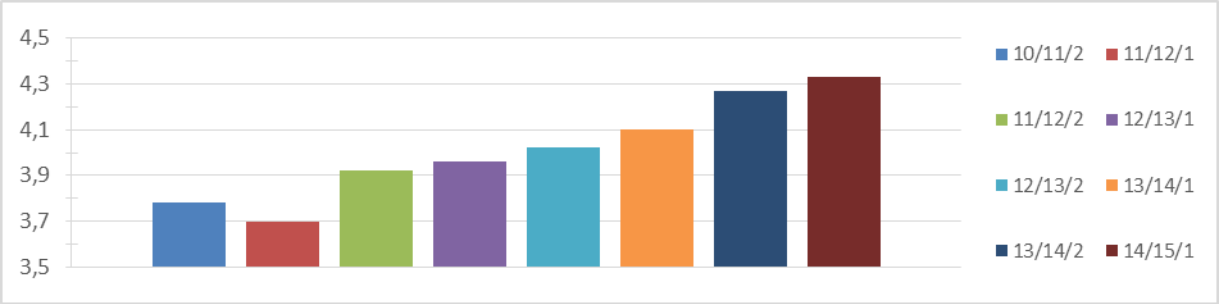

Figure 4: Ratings of a lecturer (Q1) during eight semesters

Thanks to the detailed data, in addition to financial motivation, the best performing lecturers as well as those achieving regressing ratings can be identified: the best performers shall be set as a positive example whereas those with regressive ratings shall receive help or development.

The principle of continuous improvement can be best applied considering the topics and the education method of each subject. The effects of changes implemented can be measured by checking the results of the SSM survey for each subject. To determine specific and operational development directions, the current SSM survey questionnaire does not provide sufficient information so conducting a specific and deep study from time to time may be reasonable. This is underpinned by the study conducted earlier involving a wide group of students (Tóth et al., 2013), the results of which has been used for several subjects by the lecturers. Despite a large number of students for some subjects, teaching and examining practical knowledge, solving problems in groups and the application of state-of-the-art education resources have been increased. The results (Q6) of constant improvement of a specific subject in the bachelor's programme are shown in Figure 5.

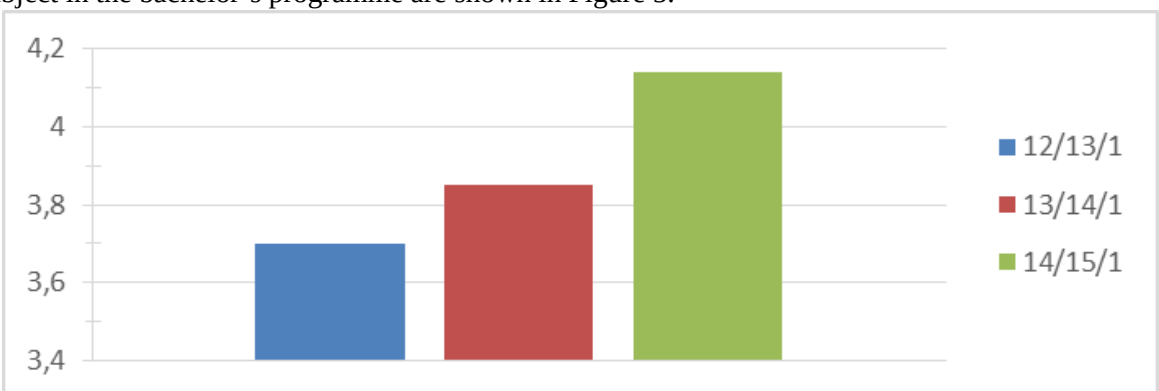

Figure 5: Results of the ratings of a specific subject (Q6)

Such active and practical transformation of education as well as the results are often opposed: it is a common counteropinion that such significant change was achieved by dramatic reduction of requirements: it is only due to better marks that the ratings of subject were improved. This also makes it important to study the performance data and the distribution of marks for each subject. The distribution of marks for the above subject is shown in Figure 6 (1 means fail and 5 means excellent).

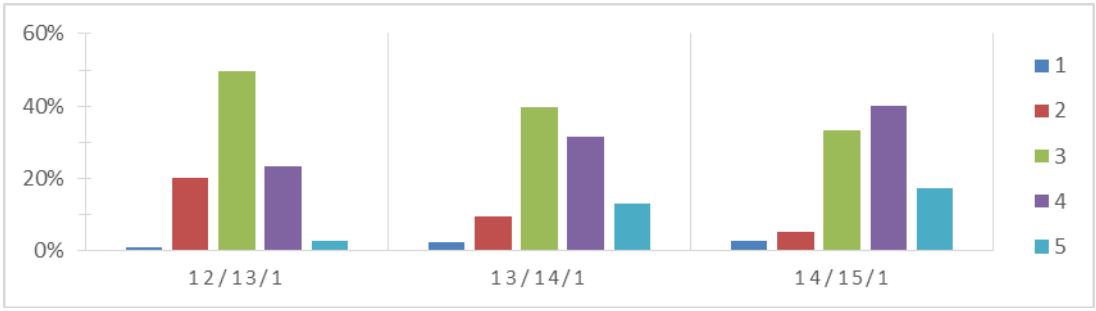

Figure 6: Distribution of marks for a specific subject

Considering marks, a change can be observed in this case, too. However, this is also due to the change in educational and examination methods: first, students were obliged to perform continuous practical work during the semester, thereby reducing the risk of dropout, and second, the rate of theoretical examination was also reduced in rating students' performance.

Conclusion

To carry out the social service activity of higher education institutions today, the application of quality management systems is essential. These systems support the institution's operation properly when they are based on TQM leadership philosophy and support the achievement of the institutions' expressed strategic goals.

According to the principles of the European Union, the unified quality goals of the institutions of the European higher education area are supported by ENQA standards and principles (ESG). Within this are, indicators serving as a base for improving operational processes play a significant role.

Applying a monitoring system at a high-level focusing on academic values is based on the proper establishment and improvement of quality culture in higher education institutions, making the operation of the institution transparent.

For most higher education institutions, the indicators describing the educational core activities represent an unexploited opportunity. The systematic analysis and assessment of these data as well as improvement based on them form the key elements of a modern TQM based organizational quality management system. Institutional development of such types ensure the increase of satisfaction of partners (students) directly.

In our study, we presented a few options for assessing satisfaction related to education to implement the above ideas in practice. The systematic and systemic application of these assessments encourages the organization to constantly improve. By improving the quality of education not only the students' satisfaction is increased but also the effectiveness of learning can increase, too.

The assessment results can be utilized for the lecturer or subject in question as well as at various levels of management of the institution in order to establish and improve the process approach and the culture of continuous improvement as a fundamental field of quality management.

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